Bamboo Fibers

Peter J. Hauser

Textile Engineering, Chemistry & Science Department

North Carolina State University

College of Textiles NC State University

Fibers from Bamboo

- Attributes of Bamboo
  - Requires little water
  - Grows quickly
  - Naturally regenerative
  - Inherently pest resistant
- Fibers must be separated from stalk
  - Mechanical processing
  - Chemical processing by chemical modification or direct dissolution

Mechanical Processing of Bamboo

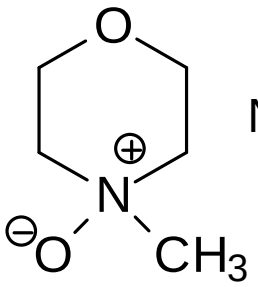
- Similar to flax processing – “natural bamboo fiber”
  - Retting – loosens internal stalk structure
    - Enzymatic process (days to weeks)
    - Chemical process (boil in mild acid/alkali)
  - Breaking - separates fiber bundles from stalk
  - Scutching- removes extraneous material
  - Hackling – separates and aligns fibers
- Labor and time intensive
- Produces linen-like fabrics

Chemical Processing of Bamboo (1)

- Similar to viscose rayon – “rayon from bamboo”
  - Sodium hydroxide treatment of leaves and stems – forms alkali cellulose
  - Carbon disulfide – forms cellulose xanthate
  - Sodium hydroxide – dissolves xanthate
  - Extrude into sulfuric acid/sodium sulfate/zinc sulfate solution – xanthate converted to fiber
  - Multiple washes – remove salts and other impurities
  - Significant air and water pollution
  - Produces soft apparel fabrics

Chemical Processing of Bamboo (2)

- Similar to lyocell – “lyocell from bamboo ”
  - N-methylmorpholine–N-oxide (NMNO) added to bamboo cellulose – cellulose dissolves



NMNO

  - Extrude into water/NMNO solution – fiber forms
  - Water wash – removes NMNO
  - NMNO recovered and reused (>99% recovery)
  - Produces fabrics similar to rayon from bamboo

Properties of Bamboo Fibers

Fiber	Antimicrobial	High water absorption	Breathability
Natural Bamboo	Documented	Documented	Documented
Rayon from Bamboo Lyocell from Bamboo	?	Dependent on process	Dependent on process

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